Space Weather Forecast

Issued on Wednesday 22 January 2025 at 00:30 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated Moderate class flares likely with a slight chance of X-class (Strong) flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity reached Moderate levels, with an isolated Moderate-class flare at 21/1039 UTC from a relatively small bipolar region in the southeast quadrant.

There are currently nine sunspot regions on the Earth-facing disc. The largest and most magnetically complex of these is located in the southwest quadrant, although flare activity remains largely muted. A moderate size, but magnetically simpler bipolar region is located in the northwest, with a further moderately large bipolar region at the west limb, now almost rotated beyond the western horizon. All remaining spots are smaller and have shown little overall recent change.

A coronal mass ejection (CME) associated with the Moderate-class flare mentioned above, has been modelled and gives a possible glance past Earth early on 25 Jan, with a slight chance of G1.

Solar Wind / Geomagnetic Activity: Ongoing fast but easing winds from a coronal hole were observed. Solar wind speed saw a gradual decline from strong to elevated levels. The Interplanetary Magnetic field, Bt, was Weak, with the north-south component, Bz, also varying Weakly. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at Background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast, with isolated Moderate-class flares likely. There is a slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: A CME associated with the M3 flare on 21 Jan, from AR3967, has been modelled and gives a possible glance past Earth early on 25 Jan, with a slight chance of G1.

Solar winds are currently elevated, around 500km/s, but continue on a slow downward trend. A further gradual reduction in speeds is expected as the influence of the fast wind from a coronal

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hole wanes. However, should the 21 Jan CME glance Earth on day 4 (25 Jan) a temporary increase may occur.

Generally Quiet to Unsettled geomagnetic activity is expected, with a reducing chance of Active intervals through the period. However, there is a slight chance of G1/Minor geomagnetic storm intervals into day 4 (24 Jan) should any CME impacts occur.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at Background with no Solar Radiation Storms occurring. However, there is a slight chance of this rising in response to any significant flares that occur.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	No	5	5	10	20
Strong	**G3**	No	1	1	5	5
Severe	**G4**	No	1	1	1	1
Extreme	**G5**	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**R1-R2 (M Class)**	Yes	70	70	70	70
Very Active	**R3-R5 (X Class)**	No	15	15	15	15

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	15	15	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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